Feb. 26, 1935. J. PROSKY 1,992,505

STRAP AND TIGHTENING KEY

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Fig 1

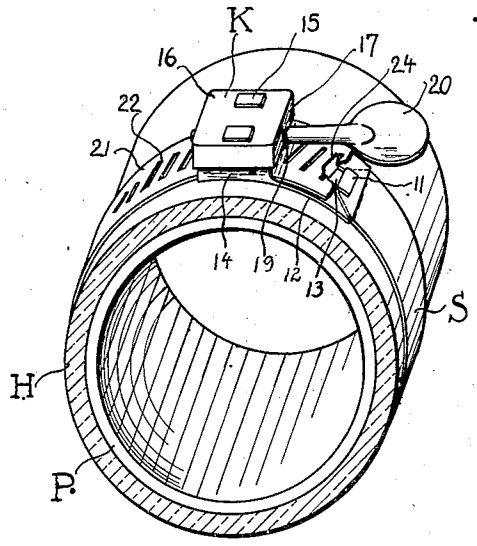

Fig 2

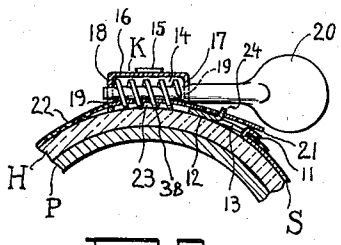

Fig 3

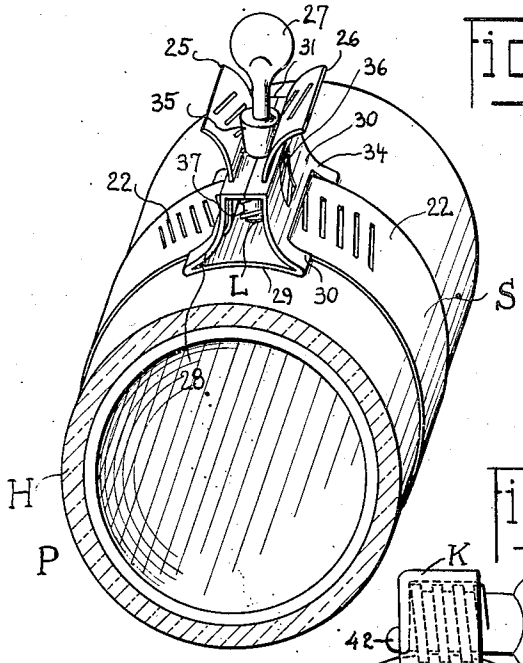

Fig 8

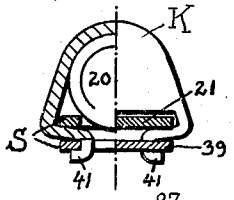

Fig 4

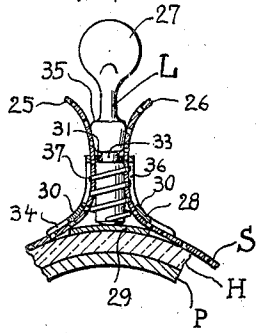

Fig 5

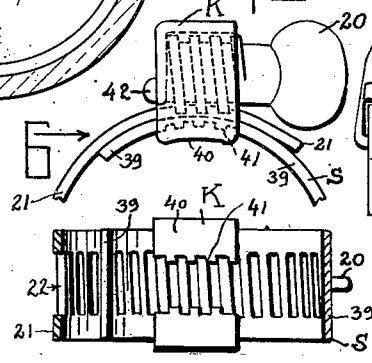

Fig 6

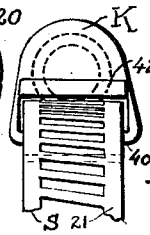

Fig 7

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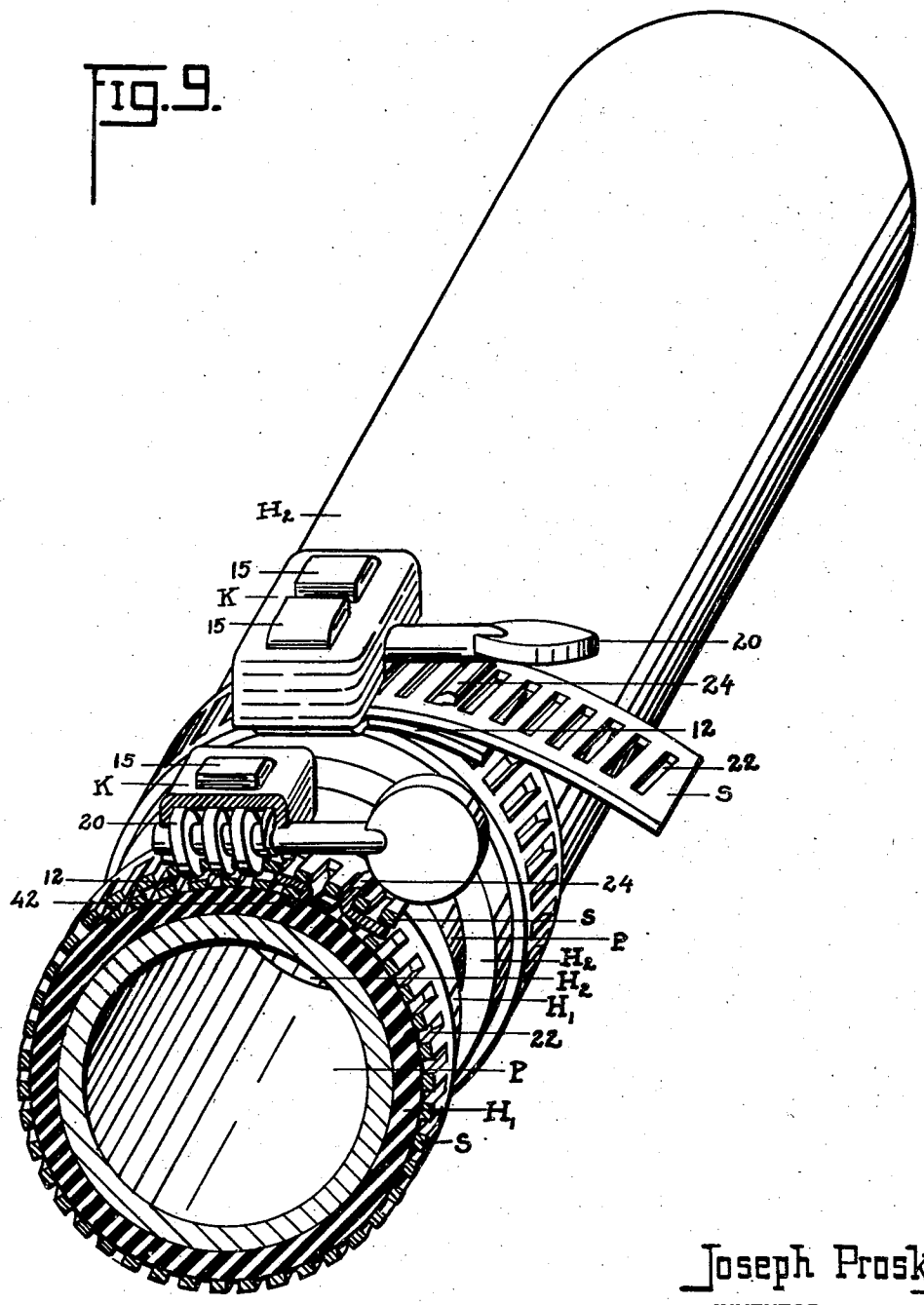
Fig. 9.



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UNITED STATES PATENT OFFICE

1,992,505

STRAP AND TIGHTENING KEY

Joseph Prosky, Bronx, N. Y.

Application March 31, 1933, Serial No. 663,756

13 Claims. (Cl. 24—19)

This invention relates to a strap and tightening key.

Such straps are used, wherever a band is placed around an object to retain it by the application of centripetal force. Such straps find a prominent use in connection with hose clamps, where such a strap is placed around and constricts a hose extended over a pipe thus providing a fluid-tight connection. The instant exemplary description of this invention will be carried through in connection with such a hose clamp.

One object of this invention is to provide a key which may be attached to any length of band or strap and may serve to constrict said strap to any size of loop desired.

Another object of this invention is to provide a perforated strap and a key, the perforations of said strap providing not only points of attachment for said key but also gripping facilities in tightening up on the constricting loop.

A further object of this invention is to provide a positive lock for a perforated strap after it has been tightened by a worm or screw engaged upon perforations in said strap.

These and other objects of this invention will be more clearly understood from the following description and accompanying drawings in which:

Fig. 1 is a perspective view showing a hose strap tightened by my strap and key onto a pipe.

Fig. 2 shows a corresponding detailed cross-section taken along the axis of the key.

Fig. 3 illustrates a modification of my invention in another perspective view.

Fig. 4 shows a corresponding detail cross-section.

Fig. 5 illustrates a simplified modification of the device of Figs. 1 and 2 in a detailed side view, limited to a showing of the overlapping ends of the strap and of the key.

Fig. 6 shows a corresponding end view taken in the direction indicated by the numeral 6 and an arrow in connection with Fig. 5.

Fig. 7 shows a bottom view corresponding to the view of Fig. 5.

Fig. 8 illustrates another modification in a detailed view which is partly executed as an end view partly as a cross-section.

Fig. 9 shows in a perspective view a modification of my invention.

Similar numerals refer to similar parts throughout the various views:—

The hose H is sectioned flush with the end of the pipe P over which it extends and to which it is to be attached. In order to clamp the hose onto the pipe, the strap S is extended around the hose H and is tightened in a constricting position by the key K.

The key K may be attached to one end of the strap S or may form part thereof. In the drawings one end of the strap is attenuated for that purpose and the tongue which forms the end of said attenuation is struck up and bent back forming a hook 11. This hook is engaged upon the base 12 of the key K, extending through a suitable opening 13 therein.

The sides 14 of the base 12 are struck up and tongues 15 extend from said struck up portions 14 through suitable slots in the cover 16 and are folded over thereonto so that the base 12 and the cover 16 form a housing.

The front and rear ends 17 and 18 of the cover 16 are struck down and are semi-circularly recessed at the center of their bottom edges. The slots 19 thus provided in said ends accommodate in bearing fashion a thumb screw 20. The said thumb screw has a spiral thread of the type also called a worm thread, such thread being ordinarily used on worms which in the art of gearing engage upon worm wheels or spur gears.

Through the housing,—i. e. underneath the struck-down ends 17 and 18 of the cover 16 and on top of the base 12, extends the free end 21 of the strap S resting on top of the base 12, as shown in the drawings. The end 21 of the strap S is provided with slanted slots 22, which are spaced and angularly disposed in conformity with the pitch of the worm thread of thumb screw 20. The slots 19 in the ends 17 and 18 journal the thumb screw at such a distance above the base 12, that the thread of said thumb screw meshes upon the teeth provided upon the end of strap 21 by virtue of and between slots 22. A clearance cut 23 is longitudinally provided in the base 12, so that the thread of the screw 20 may extend downwardly through the toothed end 21 of the strap, and may even extend into the hose H which is ordinarily made of flexible material like rubber or rubberized fabric, so that the worm is frictionally engaged upon said hose H as shown at 38. Thus the screw 20, cannot readily be jarred loose, after the strap has been tightened up thereby.

But after the strap has been tightened up by the screw 20, it may also be retained fixedly in the tightened position if one of the slots 22 in the end 21 of said strap S is hooked over the lip or hook 24, which has been struck up from the base 12 in order to form the opening 13 therein.

It is understood that the slots 22,—or grooves

struck into the material of the strap S in a manner known to those acquainted with this art for the purpose of providing teeth therein in which a worm 20 may mesh,—may be provided upon strap S to whatever extent thereof is to be engaged by the key K. It may be perforated along its whole length, in which case a tongue may be struck down from the base 12 in order to engage the strap S through one of the openings 22, instead of the arrangement of Fig. 1, in which tongue 11 is struck up from the end of the straps, and engages base 12 through opening 13. Such converse is readily understood and practiced by those acquainted with this art. A strap of sufficient length may therefore be used for the purpose of clamping any diameter hose onto a suitable pipe, or may be used in any other instance where an adjustable strap is required.

This is illustrated in Fig. 9 where two pieces of rubber hose H_1 and H_2 are connected by a pair of modified devices of my invention by way of a pipe P. The strap and key on hose H_1 are centrally cross-sectioned, and the strap S is engaged by a tongue 42 struck down from the base 12 at a point where removed from the left end of strap S, so that the strap S is engaged by the struckup lip or hook 24, close to its right end, e. g., through the second to the last hole 22. But the struck down tongue 42 may also be engaged upon strap S near its left end, in which case a strap of the same length as the one cross-sectioned on top of hose H_1 would extend way to the right as shown in connection with the strap S on hose H_2.

In the views of Figs. 3 and 4 the strap S, which clamps hose H onto pipe P is shown to be provided with slots 22 at both of its ends, 25 and 26, which are engaged upon a key L. The key L again comprises a thumb screw 27 and a housing 28. The housing 28 is bent up from one piece of flat sheet material (similar to that of the housing 12) and comprises a base part 29, curved sides 30 bent back onto said base, and top strips 31 which form a platform; an opening centrally provided between strips 31 in said platform rotatably accommodates the stem 33 of said thumb screw 27.

The housing 28 is provided with suitable clearance cuts 34 near the edges at which the sides 30 are bent back on the base 29 and with narrow slots at the platform through which the ends 25 and 26 of the strap S extends into and out from the housing 28, respectively. The worm screw 27 may be provided with a conical lug 35 above the stem 33, which serves to spread the ends 25 and 26 of the slot S apart after they have been extended through the housing 28. Clearance cuts 36 may be provided in the sides 30 of the housing, in order to allow free play for the threaded part 37 of the thumb screw 27.

It is readily understood that in the case of both modifications shown the ends 21 or the ends 25 and 26 of the strap may be extended through the housing and threaded into mesh engagement with the thumb screws, said screws pulling the straps through the housings as they are turned in clockwise direction. The end thrust of the thumb screw is taken up in one instance by the struck-down end 18 of the cover 16, in the other instance by the base 29 of the housing.

The manner in which a continuously perforated strap may be adapted to afford a firm but adjustable mounting for the key in any desired position, and will also provide a firm hold for tightening the screw, is illustrated in the modifications of Figs. 5, 6 and 7.

The key K is here shown to provide a socket into which the thumb screw 20 may be inserted at will, as long as the ends of the strap have not been inserted therethrough. But when the two ends 21 and 39 of the strap S are inserted in the key, the key retains the screw 20 in mesh with the end 21 of strap S, inside of the key, serving as a journal rotatably supporting the threaded part of thumb screw 20.

The end 21 of the strap S is,—when in operative position,—slidably supported by the other end 39 of the strap which rests on the bottom horizontal flaps 40 extending from the key towards each other as integral parts thereof. From the flaps 40 the teeth 41 are struck up at a distance apart from each other which corresponds with the pitch of either the perforations provided for engagement by screw 20 in the strap S or perforations provided for this particular purpose. Whereas the end 39 supports the end 21 in a position of mesh with the thumb screw 20, the reverse is also true, i. e., the teeth 41 retain the end 39 in a fixed position on the key as long as the screw 20 and the end 21 are in an operative position.

A strap of the kind shown may of course be readily cut to a desired length and then one end 39 thereof is inserted into the key K. Then the other end 21 of the strap is pushed through the key, and into the part of the said end which emerges to the right of the key, the thumb screw 20 may be meshedly inserted. When the end 21 of strap S is then pulled back to the left, the screw 20 is pulled into its socket in key K, whereupon all the parts are in an operative position. In other words by now rotating the thumb screw 20 in a clockwise direction, the strap may be tightened up so that its loop constricts whatever it is extended over.

In Fig. 6 the back wall of the key is shown to be beaded at 42 below the point where it offers a thrustwise support for the thumb screw 20. This bead confronts the slot through which the two ends of the strap are extended so that the insertion of the end 21 is facilitated.

Of course a comparatively heavy and strong material should be used for the strap, to prevent deformation thereof by a tightening up of the hand screw 20. But when it is not desirable to resort to the use of a material for the strap of such strength as to prevent a slight deformation, the two ends of the strap should not be slidably disposed on top of each other because a deformed end 21 of the strap may lock upon the end 39.

For that reason another modification of my key is provided for in Fig. 8. Here the key is partly closed underneath the one end 21 of the strap in order to support it in mesh with the screw 20. But from the inner ends of the bottom supporting wall of key K extend downwardly the teeth 41 which are bent back in opposite directions at their lower ends so that they engage upon the perforations or threads provided in the end 39 of strap S. If in this instance resilient material is used for the sides of key K, the key K may be removed from the end 39 of the strap by compressing said sides whereby the teeth 41 are disengaged from the end 39. Of course this is only possible as long as the end 21 of the strap and the worm 20 are not in position in the key. After those parts are properly positioned in the key they serve to space said sides apart and thus prevent disengagement of the end 39 from the teeth 41.

Although I have shown and described one form of embodiment of my invention in detail, yet I do not wish to be limited thereby, except as the state of the art and the appended claims may require, for it is obvious that various modifications and changes may be made in the form of embodiment of my invention, without departing from the spirit and scope thereof.

What I claim is:—

1. In a hose clamp, a perforated strap, a key detachably engaged upon perforations of said strap, and a screw comprised and thrustwise supported in said key and meshing upon the perforations of the looped-back free end of said strap.

2. In a hose clamp, a key, a hook mounted on said key, a screw comprised in said key, a strap extending through said key, meshedly engaged by said screw, and locked on said key by said hook, when said hook is extended through one of the perforations of said strap.

3. In a hose clamp, a key, a screw comprised and socketed in said key ,and a perforated strap extending through said key, one end of said strap meshing said screw, and the other end of said strap being detachably retained on said key.

4. In a hose clamp, a key, a screw comprised and socketed in said key, and a perforated strap extending through said key, one end of said strap meshing said screw, and the other end of said strap being detachably and adjustably retained on said key.

5. In a hose clamp, a key, a screw comprised and socketed in said key, a perforated strap extending through said key, one end of said strap meshing said screw, and teeth on said key engaged upon the perforations of the other end of said strap.

6. In a hose clamp in combination with a perforated strap, and a key comprising a screw and a toothed covering, said covering retaining one end of said strap in mesh with said screw and the other end thereof in mesh with its teeth, when said ends and screw are accommodated in said covering.

7. In a hose clamp, a key, teeth on said key, a screw socketed in said key, and a strap perforated in order to provide a thread therein, the ends of said strap being meshedly engaged by said screw and said teeth, respectively, when they are overlappingly engaged by said key.

8. In a hose clamp, a key, teeth struck up in said key, a screw socketed in said key, and a strap perforated in order to provide a thread thereon, the ends of said strap being meshedly engaged by said screw and said teeth, respectively, when they are overlappingly engaged by said key.

9. In a hose clamp, a key, teeth extending up from said key, a screw socketed in said key, and a strap perforated in order to provide a thread thereon, the ends of said strap being meshedly engaged by said screw and said teeth, respectively, when they are overlappingly engaged by said key.

10. In a hose clamp, a key, a screw socketed in said key, and a strap perforated in order to provide a thread thereon, the ends of said strap being meshedly engaged by said screw and vertically guided in said key, when they are overlappingly engaged by said key.

11. In a hose clamp, a key, a screw socketed in said key, and a strap perforated in order to provide a thread thereon, the ends of said strap being meshedly engaged by said screw and extending down in said key and then horizontally in opposite directions when they are overlappingly engaged by said key, said key being resilient and said screw being disengageable from the second of said ends when said key is collapsed, but locked in said second end when the first of said ends is engaged by said screws in said key.

12. In a hose clamp, a key comprising a tightening screw, and a strap with a toothed surface, said surface being meshedly engaged by opposite sides of said screw, when the ends of said strap are operatively extended into said key.

13. In a hose clamp, a key comprising a tightening screw, a toothed strap, and means on said key guiding the ends of said strap past opposite sides of said screw in meshed engagement with said screw.

JOSEPH PROSKY.